

SEQUENCE LISTING

<110> Duvick, Jon

<120> Compositions and Methods for Fummonisin Detoxification

<130> 5718-111

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<170> PatentIn Ver. 2.0

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§ <211> 1691

§ <212> DNA

§ <213> Exophiala spinifera

§ <220>

§ <223> flavin monooxygenase with intron

§ <400> 1

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<213> Exophiala spinifera

<220>
<223> flavin monooxygenase, fully spliced cDNA

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<211> 545
<212> PRT
<213> Exophiala spinifera

<220>

<223> flavin monooxygenase, translation of fully spliced
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Ala Ile Ile Val Gly Ala Gly Leu Ser Gly Ile Ser Ala Val Tyr Lys
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Leu Arg Lys Leu Arg Leu Asn Ala Lys Ile Phe Glu Gly Ala Pro Asp
35 40 45

Phe Gly Gly Val Trp His Trp Asn Arg Tyr Pro Gly Ala Arg Val Asp
50 55 60

Ser Glu Thr Pro Phe Tyr Gln Leu Asn Ile Pro Glu Val Trp Lys Asp
65 70 75 80

Trp Thr Trp Ser Cys Arg Tyr Pro Asp Gln Lys Glu Leu Leu Ser Tyr
85 90 95

Val His His Cys Asp Lys Ile Arg Gly Leu Arg Lys Asp Val Tyr Phe
100 105 110

Gly Ala Glu Val Val Asp Ala Arg Tyr Ala Arg Asp Leu Gly Thr Trp
115 120 125

Thr Val Lys Thr Ser Ala Gly His Val Ala Thr Ala Lys Tyr Leu Ile
130 135 140

Leu Ala Thr Gly Leu Leu His Arg Lys His Thr Pro Ala Leu Pro Gly
145 150 155 160

Leu Ala Asp Phe Asn Gly Lys Val Ile His Ser Ser Ala Trp His Glu
165 170 175

Asp Phe Asp Ala Glu Gly Gln Arg Val Ala Val Ile Gly Ala Gly Ala
180 185 190

Thr Ser Ile Gln Ile Val Gln Glu Leu Ala Lys Lys Ala Asp Gln Val
195 200 205

Thr Met Phe Met Arg Arg Pro Ser Tyr Cys Leu Pro Met Arg Gln Arg
210 215 220

Thr Met Asp Arg Asn Glu Gln Thr Ala Trp Lys Ala Tyr Tyr Pro Thr
225 230 235 240

Leu Phe Glu Ala Ser Arg Lys Ser Arg Ile Gly Phe Pro Val Gln Ala
245 250 255

Pro Ser Val Gly Ile Phe Glu Val Ser Pro Glu Gln Arg Glu Ala Tyr
260 265 270

Phe Glu Glu Leu Trp Glu Arg Gly Ala Phe Asn Phe Leu Ala Cys Gln
275 280 285

Tyr Arg Glu Val Met Val Asp Lys Lys Ala Asn Arg Leu Val Tyr Asp
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Phe Trp Ala Lys Lys Thr Arg Ser Arg Ile Val Asn Pro Ala Lys Arg
305 310 315 320

Asp Leu Met Ala Pro Leu Glu Pro Pro Tyr Trp Phe Gly Thr Lys Arg
325 330 335

Ser Pro Leu Glu Ser Asp Tyr Tyr Glu Met Leu Asp Lys Pro Ser Val
340 345 350

Glu Ile Val Asn Leu Glu Gln Ser Pro Ile Val Ala Val Thr Lys Thr
355 360 365

Gly Val Leu Leu Ser Asp Gly Ser Lys Arg Glu Cys Asp Thr Ile Val
370 375 380

Leu Ala Thr Gly Phe Asp Ser Phe Thr Gly Ser Leu Thr His Met Gly
385 390 395 400

Leu Lys Asn Lys His Gly Val Asp Leu Lys Glu Val Trp Lys Asp Gly
405 410 415

Ile Ser Thr Tyr Met Gly Val Phe Ser His Gly Phe Pro Asn Ala Phe
420 425 430

Phe Val Ala Thr Ala Gln Ala Pro Thr Val Leu Ser Asn Gly Pro Thr
435 440 445

Ile Ile Glu Thr Gln Val Asp Leu Ile Ala Asp Thr Ile Ala Lys Leu
450 455 460

Glu Ala Glu His Ala Thr Ser Val Glu Ala Thr Lys Ser Ala Gln Glu
465 470 475 480

Ala Trp Ser Ile Met Ile Ala Lys Met Asn Glu His Thr Leu Phe Pro
485 490 495

Leu Thr Asp Ser Trp Trp Thr Gly Gly Asn Ile Pro Gly Lys Ala Thr
500 505 510

Arg Ala Leu Thr Phe Ile Gly Gly Ile Ala Leu Tyr Glu Gln Ile Cys
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Gln Glu Lys Val Ala Asn Trp Asp Gly Phe Asp Val Leu His Ala Pro
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Cys
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<210> 4

<211> 1464

<212> DNA

<213> Exophiala spinifera

<220>

<223> aldehyde dehydrogenase , fully spliced cDNA

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<220>
<223> aldehyde dehydrogenase, translation of fully
spliced cDNA

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35 40 45

Asp Val Asp Ser Ala Val Ala Ala Ser Val Gln Ala Val Lys Lys Gly
50 55 60

Pro Trp Lys Lys Phe Thr Gly Ala Gln Arg Ala Ala Cys Met Leu Lys
65 70 75 80

Phe Ala Asp Leu Ala Glu Lys Asn Ala Glu Lys Leu Ala Arg Leu Glu
85 90 95

Ser Leu Pro Thr Gly Arg Pro Val Ser Met Ile Thr His Phe Asp Ile
100 105 110

Pro Asn Met Val Ser Val Phe Arg Tyr Tyr Ala Gly Trp Ala Asp Lys
115 120 125

Ile Ala Gly Lys Thr Phe Pro Glu Asp Asn Gly Lys Pro Asn Trp Arg
130 135 140

Tyr Glu Pro Met Gly Val Cys Ala Gly Ile Ala Ser Trp Asn Ala Thr
145 150 155 160

Phe Leu Tyr Val Gly Trp Lys Ile Ala Pro Ala Leu Ala Ala Gly Cys
165 170 175

Ser Phe Ile Phe Lys Ala Ser Glu Lys Ser Pro Leu Gly Val Leu Gly
180 185 190

Leu Ala Pro Leu Phe Ala Glu Ala Gly Phe Pro Pro Gly Val Val Gln
195 200 205

Phe Leu Thr Gly Ala Arg Val Thr Gly Glu Ala Leu Ala Ser His Met
210 215 220

Asp Ile Ala Lys Ile Ser Phe Thr Arg Ser Val Gly Gly Arg Ala
225 230 235 240

Val Lys Gln Ala Thr Leu Lys Ser Asn Met Lys Arg Val Thr Leu Glu
245 250 255

Leu Gly Glu Lys Pro Thr Ile Val Phe Asn Glu Ala Pro Leu Glu Arg
260 265 270

Gln Ser Gly Glu Ser Ala Lys Asp Phe Ser Lys Phe Gly Gln Ile Trp
275 280 285

Val Pro Pro Ser Cys Leu Leu Val Gln Trp Gly Asn Leu Ala Glu Lys
290 295 300

Phe His Gly Val Arg His Gly Ser Phe Gly Gly Cys Gln Arg Trp Leu
305 310 315 320

Gly Gln Asn Pro Leu Glu Pro Lys Arg Thr His Gly Pro Phe Val Asp
325 330 335

Lys Ser Gln Tyr Asp Arg Val Leu Gly Asn Ile Asp Val Gly Lys Asp
340 345 350

Thr Ala Gln Leu Leu Thr Gly Val Gly Arg Lys Gly Asp Lys Gly Phe
355 360 365

Ala Ile Glu Pro Thr Ile Phe Val Asn Pro Lys Pro Gly Ser Lys Ile
370 375 380

Trp Phe Glu Glu Ile Phe Gly Pro Val Leu Ser Ile Lys Thr Phe Lys
385 390 395 400

Thr Glu Glu Glu Ala Ile Glu Ile Ala Asn Asp Thr Thr Tyr Gly Leu
405 410 415

Ala Ser Val Ile Tyr Thr Lys Ser Leu Asn Arg Gly Leu Arg Val Ser
420 425 430

Ser Ala Leu Glu Thr Gly Gly Val Ser Ile Asn Phe Pro Phe Ile Pro
435 440 445

Glu Thr Gln Thr Pro Phe Gly Gly Met Lys Gln Ser Gly Ser Gly Arg
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Glu Leu Gly Glu Glu Gly Leu Lys Ala Tyr Leu Glu Pro Lys Thr Ile
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Asn Ile His Val Asn Ile Glu
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<211> 1764

<212> DNA

<213> Exophiala spinifera

<220>

<223> permease, partially spliced cDNA

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aaaaaaaaagcgg ccgctgaatt ctag 1764

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<212> DNA
<213> Exophiala spinifera

<220>
<223> permease, fully spliced cDNA

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<212> PRT
<213> Exophiala spinifera

<220>
<223> permease, translation of fully spliced cDNA

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35 40 45

Ser Leu Ala Phe Val Ile Cys Asn Ser Trp Ala Gly Ile Ser Gly Ser
50 55 60

Leu Gln Leu Ala Leu Leu Ala Gly Gly Pro Val Thr Leu Leu Tyr Gly
65 70 75 80

D Ile Leu Ile Ser Thr Leu Val Tyr Ile Cys Ile Ala Phe Ser Leu Ala
85 90 95

Glu Leu Thr Ser Val Tyr Pro Thr Ala Gly Gly Gln Tyr His Phe Ala
100 105 110

Ser Ile Leu Ala Pro Lys Ser Ile Asn Arg Ser Ile Ser Tyr Val Cys
115 120 125

Gly Leu Val Ser Leu Leu Ser Trp Ile Ala Ile Gly Ser Ser Val Thr
130 135 140

D Met Ile Pro Ala Gln Gln Ile Pro Ala Leu Ile Ala Ala Tyr Ser His
145 150 155 160

Thr Tyr Ser Gln Asp Ser Trp His Val Phe Leu Ile Tyr Glu Gly Val
165 170 175

Ala Leu Val Val Leu Leu Phe Asn Leu Phe Ala Leu Lys Arg Asn Pro
180 185 190

Trp Val His Glu Ile Gly Phe Gly Leu Thr Ile Ala Leu Phe Val Ile
195 200 205

Ser Phe Ile Ala Ile Leu Ala Arg Ser Asn Pro Lys Ala Pro Asn Ser
210 215 220

Gln Val Trp Thr Ala Trp Ser Asn Tyr Thr Gly Trp Ser Asp Gly Val
225 230 235 240

Cys Phe Ile Leu Gly Leu Ser Thr Ser Cys Phe Met Phe Ile Gly Leu
245 250 255

Asp Ala Ala Met His Leu Ala Glu Glu Cys Thr Asp Ala Ala Arg Thr
260 265 270

Val Pro Lys Ala Val Val Ser Ala Ile Ile Gly Phe Cys Thr Ala
275 280 285

Phe Pro Tyr Thr Ile Ala Val Leu Tyr Gly Ile Thr Asp Leu Asp Ser
290 295 300

Ile Leu Ser Ser Ala Gly Tyr Ile Pro Phe Glu Thr Met Arg Gln Ser
305 310 315 320

Ala Arg Ile Arg Leu Phe Ala Thr Val Leu Ser Cys Gly Gly Ile Val
325 330 335

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370 375 380

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385 390 395 400

Thr Ala Phe Asn Ala Leu Val Asn Ser Ala Val Val Leu Gln Gln Leu
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Ser Phe Leu Ile Pro Ile Ala Leu Leu Tyr Gln Lys Arg Asp Pro
420 425 430

Lys Phe Leu Pro Ser Thr Arg Ala Phe Val Leu Pro Arg Gly Ile Gly
435 440 445

Phe Leu Val Asn Val Leu Ala Val Val Phe Thr Ser Val Thr Thr Val
450 455 460

Phe Phe Ser Phe Pro Leu Thr Val Pro Thr Ala Ala Ser Thr Met Asn
465 470 475 480

Tyr Thr Ser Ala Ile Ile Gly Val Ala Leu Ala Leu Gly Val Leu Asn
485 490 495

Trp Val Val His Ala Arg Lys His Tyr Gln Gly Pro His Leu Glu Leu
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Asp Gly Arg Val Val Gly Ala Glu Phe Gln Val Gly Pro
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<212> DNA

<213> Exophiala spinifera

<220>

<223> p-glycoprotein, with introns

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